

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 12498 (1988): Method of test for evaluation of performance of air pressure regulators [PGD 16: Fluid Power]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



*Indian Standard***METHOD OF TEST FOR EVALUATION OF
PERFORMANCE OF AIR PRESSURE REGULATORS**

1. Scope — Specifies the method for evaluation of performance of pressure regulators used in pneumatic fluid power systems.

2. Definitions and Symbols — Reference is made to IS : 10416-1982 'Glossary of fluid power terms', and IS : 7513-1974 'Graphic symbols for fluid power systems', for definitions of various terms and graphic symbols, respectively, appearing in this standard.

3. Test Conditions and Equipment

3.1 Tests shall be carried out with air in the temperature range of 10 to 45°C.

3.2 The air shall be filtered for removal of water and particulate contaminant prior to entry into the test regulator.

3.3 The measurement of pressure parameters shall be held within ± 2 percent accuracy and flow parameters shall be held within ± 5 percent.

3.4 Suitable test rigs as shown in circuit diagram at each of the tests shall be devised, ensuring any safety requirements in the event of failure of the envelope of the test unit.

3.5 Tests shall be carried out in the same order as listed in the standard.

4. Tests

4.1 Proof Pressure Test — With the secondary pressure set at the maximum and the outlet blocked, the unit shall be subjected to an air pressure of 1.5 times the rated maximum input pressure for at least 3 minutes. The unit failing in this test shall not qualify for any further test.

Note — Necessary safety precautions shall be ensured in carrying out the test.

4.2 Pressure Regulation — Keeping the output port blocked, the regulator shall be supplied with air at rated maximum input pressure and the secondary pressure shall be varied over the operating range. The test unit shall display smooth and continuous regulation over the entire range of operation.

4.3 Flow Characteristics

4.3.1 The test regulator shall be included in a test circuit as shown in Fig. 1.

4.3.2 The flow through the regulator shall be cut off by closing the flow control valve. Keeping the primary pressure at the rated maximum, the secondary pressure shall be set at a value selected from Table 1.

TABLE 1 SECONDARY PRESSURE RATINGS

(Clauses 4.3.2, 4.3.4, 4.4.1, 4.4.4 and 4.6.6)

Test Regulator Range (MPa)	Test Pressure (MPa)		
0 to 7	1.5	4	7
0 to 17	3.0	10	17
0 to 35	7.0	20	35
0 to 70	14	40	70
0 to 140	30	80	140

Adopted 7 November 1988

© May 1989, BIS

Gr 2

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

4.3.3 The flow rate through the regulator shall then be increased gradually, recording the secondary pressure at a select number of flow settings so as to obtain a factual representation of flow against secondary pressure curves over the recommended range of flow rate.

Note—The primary pressure is to be kept constant throughout the experiment with readjustments, if necessary, during the test.

4.3.4 Measurements in accordance with 4.3.3 shall be repeated for each of the other values of secondary pressure listed in Table 1.

4.4 Pressure Characteristics—The regulator under test shall be included in a circuit as shown in Fig. 1. The primary pressure shall be maintained at the rated maximum.

4.4.1 The secondary pressure shall be set at a value selected from Table 1.

4.4.2 Flow rate through the regulator shall be set at a value selected from Table 2.

Note—The primary and secondary pressures may be reset, if necessary, to maintain the desired values.

TABLE 2 FLOW RATE SELECTION (Clauses 4.4.2 and 4.4.5)				
Port Size mm	Secondary Air Flow dm^3/s^*			
6	.95	3.78	5.08	10.16
9	1.42	5.08	10.16	20.32
12	2.36	7.80	15.60	31.20
18	2.72	12.88	25.76	51.52
25	5.08	23.40	46.80	93.60

*Flow is cubic decimetres per second, normalized to standard atmospheric conditions.

4.4.3 The primary pressure shall then be gradually decreased in steps, adjusting the flow control valve for maintaining the selected flow rate, recording the secondary pressure at each of these steps.

4.4.4 The measurement shall be repeated for each of the other values of secondary pressure as given in Table 1.

4.4.5 Measurements in accordance with 4.4.2 and 4.4.3 shall be repeated for each of the values of flow rate recommended for the size of the unit in Table 2.

4.5 Leakage Test—Keeping the primary pressure at the rated maximum; the regulator handle shall be fully released and leakage of air at the secondary shall be checked.

4.6 Relief Characteristics

4.6.1 The regulator under test should be included in a circuit as shown in Fig. 2. A suitable test pipe from the relief port of the test regulator is led out and its free end is submerged in a beaker of water.

4.6.2 Select supply pressures of 35, 70, 100 and 150 MPa.

4.6.2.1 Set supply pressure at one of the primary pressure values with the help of supply regulator.

4.6.3 With the flow control valve shut off, and the over pressure regulator turned off, the secondary (test) pressure is set at the lowest value in accordance with Table 1.

Note—The flow control valve remains in closed position throughout the duration of test.

4.6.4 The over pressure control regulator is operated slowly to increase the over pressure till the test regulator relief seat opens as indicated by bubbling or increase of rate of bubbles in the beaker. The secondary over pressure required to effect the relief flow is recorded.

4.6.5 The secondary over pressure is further increased in steps and the safe of relief flow is recorded at each of these over pressures over any desired range.

4.6.6 Keeping value of primary pressures in accordance with 4.6.2.1 constant, repeat the test for other secondary test pressure as specified in Table 1.

4.6.7 Steps for 4.6.2 to 4.6.6 shall be repeated for all over primary pressures as specified in 4.6.2.

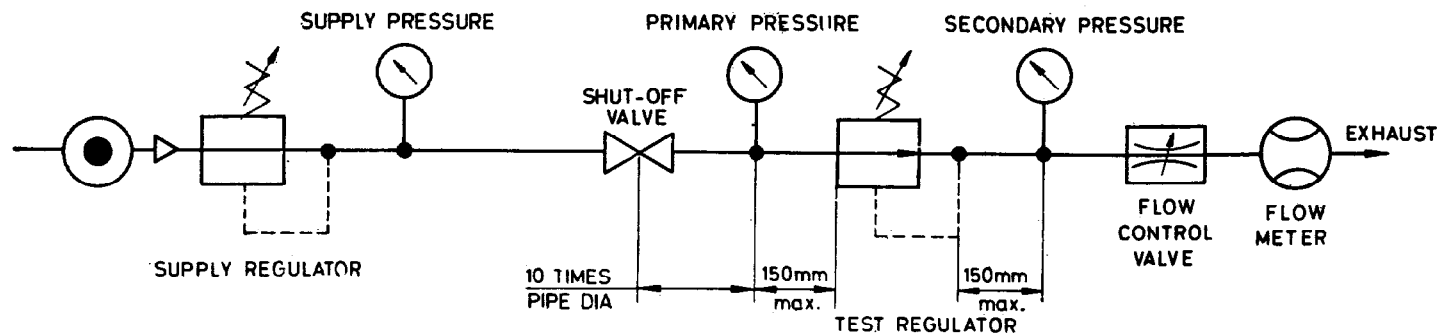


FIG. 1 TEST CIRCUIT FOR FLOW CHARACTERISTICS

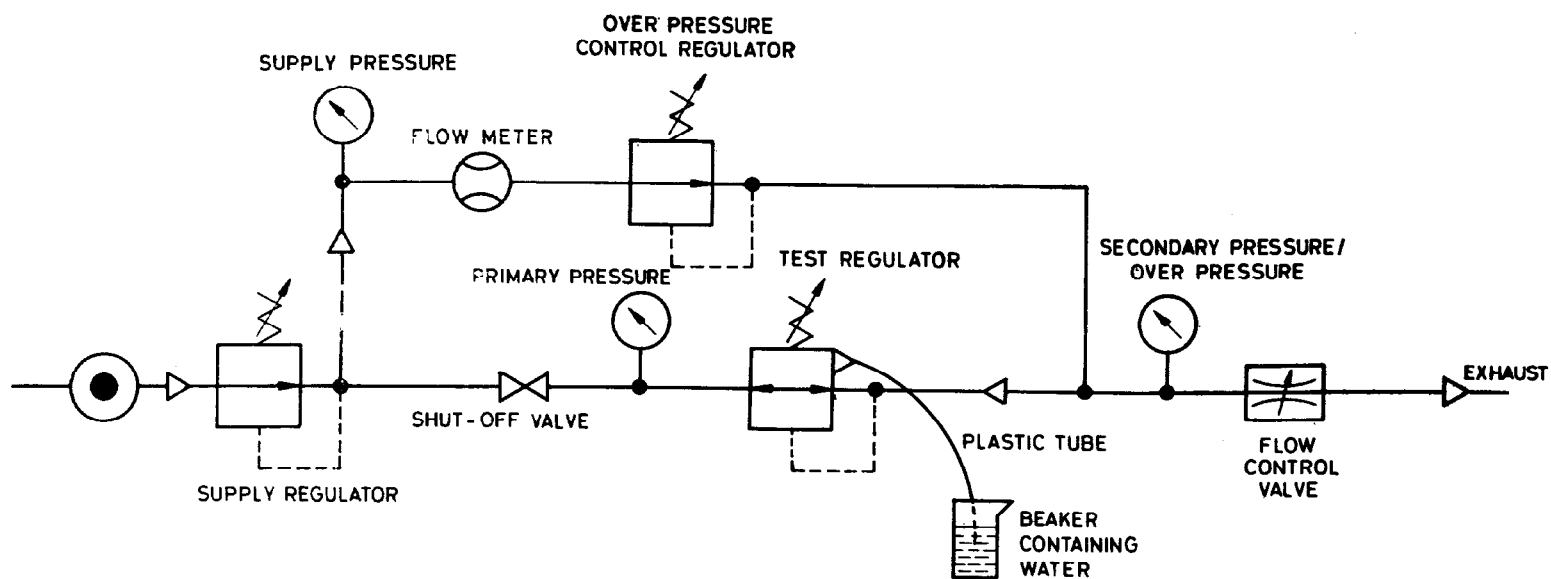


FIG. 2 TEST CIRCUIT FOR RELIEF CHARACTERISTICS

4.7 Durability Test

4.7.1 The unit under test shall be placed in circuit as shown in Fig. 3. The primary and secondary pressure shall be set at their respective rated maximum values, maintaining the rated flow for the size of the regulator. The test rig shall be such as to achieve the pressure rise and decay under 0.1 s. The valves before and after this test unit are operated such as to provide high and low pressure periods, over 1 million cycles.

4.7.2 Each of the 2-port valves before and behind the test valve shall be operated once a second alternately with an interval of 0.5s between opening and closing of each valve.

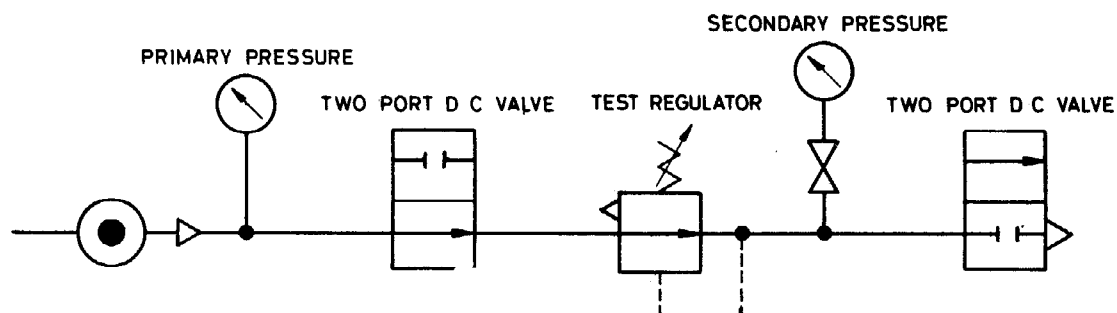


FIG. 3 TEST CIRCUIT FOR DURABILITY TEST

5. Test Results

5.1 The unit shall display smooth and continuous pressure regulation over the specified range.

5.2 The flow characteristics of the unit shall be drawn at each of the selected test (secondary) pressures by plotting regulated pressure (abscissa) against flow rate (ordinate) as a continuous curve.

5.3 The pressure characteristics of the unit shall be drawn by regulated pressure (ordinate) against primary pressure as a continuous curve at each of the selected flow rates.

5.4 The leakage test shall not reveal any leakage from the primary to the secondary.

5.5 The relief characteristics, the graph of secondary (over) pressure as ordinate against relief flow rate as abscissa shall be drawn as a continuous curve for each of the primary pressures.

6. Classification of Tests

6.1 Routine Inspection Test — Shall constitute the test specified at 4.1, 4.2 and 4.5.

6.2 Type Test — Shall constitute the tests specified at 4.3, 4.4, 4.6 and 4.7.

EXPLANATORY NOTE

This standard has been formulated taking into account the current practices prevalent in fluid power industry in the country. This standard does not specify performance requirement of the air-pressure regulators. The performance requirements will be covered in the individual product specification for air-pressure regulators. Till such time as the specifications for air-pressure regulators are formulated, the performance requirements shall be as agreed to between the manufacturer and the purchaser.